

生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	寄居蟹利用社群網路尋找新家園 (Hermit Crabs Use Social Networking to Find New Homes)
生物系統 LIVING SYSTEM	加勒比海寄居蟹 (Caribbean hermit crab)
功能類別 FUNCTIONS	#同一物種內的合作 #Cooperate Within the Same Species #優化形狀/材質 #Optimize Shape/Materials #防溫度 #Protect From Temperature #保護自己免受動物侵害 #Protect From Animals #分佈實體 #Distribute Solids
作用機制標題	螃蟹採用「同步空缺鏈」行為來快速找到新殼，避免危險的無家可歸。 (Crabs use “synchronous vacancy chain” behavior to find new shells fast and avoid risky homelessness.)
生物系統/作用 機制示意圖 (確認版權、註明出處；畫質)	出處: https://asknature.org/strategy/social-networking-aids-housing-search/ 
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	
導言： 很久以前，寄居蟹找到了一個巧妙的方法來解決一直困擾人類的問題：如何找到適合它們的新住所，以及如何有效地管理它們的房屋存量。 寄居蟹身體柔軟，無法抵禦炎熱的陽光和掠食者的尖銳牙齒和喙。為了保護	

自己，它們蹲在其他海洋生物丟棄的貝殼裡，並像露營拖車一樣隨身攜帶這些新發現的庇護所。

但隨著寄居蟹一生中不斷長大，它們的殼會變得越來越緊，使得他們必須迅速找到更大的殼，否則就有暴露和脆弱的風險。

策略：

寄居蟹使用一種名為「同步空缺鏈」的社群網絡行為來交換殼，若缺乏「同步空缺鏈」，他們將無法有效的分配有限的、可重複使用的殼。

每當有空殼被沖上岸時，附近的寄居蟹都會聚集過來，無論它的形狀如何。如果尺寸不合適，他們都會等待，就像一群小學生一樣，它們按照大小順序排隊，最大的寄居蟹排在隊伍的最前面，它是第一個體驗新空殼的寄居蟹。如果殼合適，寄居蟹就會搬進去，排隊的下一隻寄居蟹會迅速進入空出的殼中，留下一個空殼給下一隻排隊的寄居蟹，因此寄居蟹們經常背著彼此的殼，並且許多寄居蟹可以迅速地同時升級自己的居住環境，以避免無家可歸的風險，即使只有幾分鐘。

這種社交網路行為被稱為「同步空缺鏈」，它能引發乘數效應：一個貝殼的引入不僅使在正確的時間出現在正確的地點的另一隻幸運的寄居蟹受益，也使社區中的許多個體受益。不僅如此，它還能確保有限的、可重複使用的殼能有效分配。

潛力：

不難看出人們如何組織「同步空缺鏈」(“synchronous vacancy chain”) 來巧妙地循環利用資源。例如，每當人們有了新房子、新車或新工作時，他們的舊房子、舊車和舊工作就會被別人接手，類似的社交網路還可以激勵社區以更具成本效益、更少浪費的方式分配水和食物。

同步空缺鏈也許能夠創建更好的技術轉移系統，這樣人們就可以升級他們的電腦、手機和電子設備，同時將舊的但仍然可用的設備傳遞給其他可以從中受益的人，這樣的網絡可以節省金錢並減少環境浪費。此外應更多地利用電子產品中的稀有金屬，避免因開採以及回收這些金屬時，所消耗的大量能源導致環境惡化。

Introduction:

Long ago, hermit crabs figured out an elegant way to solve a problem that continues to frustrate humans: How to find new abodes that are just right for them and how to efficiently manage their housing stock in general.

Hermit crabs have soft bodies that are defenseless against the hot sun and the sharp teeth and beaks of predators. For protection, they hunker into shells discarded by other sea creatures, and they carry their newfound shelters around like camping trailers.

But as hermit crabs grow throughout their lives, their shells become too tight. They must find larger ones—and they must do it fast, or risk being left exposed and vulnerable.

The Strategy:

Whenever any empty shell washes ashore, crabs throughout the vicinity converge on it, no matter its shape. If the size isn't right, they wait.

They line up in size order, like a class of elementary-school children, often piggybacking on one another's shells. The biggest crab is at the head of the line, and it is the first to try on the empty shell. If the shell fits, the crab moves in. And that launches a chain reaction—because one crab's castoff is another's new castle. The next crab in line will swiftly switch into the vacated shell, leaving behind an empty shell for the next in line. In quick succession, many crabs will simultaneously upgrade their living quarters and avoid the risks of homelessness for even a few minutes.

This social networking behavior is called a “synchronous vacancy chain,” and it triggers a multiplier effect: The introduction of one shell benefits not just one lucky crab in the right place at the right time, but many individuals in the community. Not only that, it ensures that limited, reusable goods are efficiently distributed.

The Potential:

It's not hard to see how people can organize “synchronous vacancy chains” to resourcefully recycle resources. Anytime people get new houses, cars, or jobs, for example, their old houses, cars, and jobs open up for use by others. Similar social networking could also inspire more cost-effective and less wasteful distribution of water and food in communities.

Synchronous vacancy chains might also work to create better systems for technology transfer, so that people can upgrade their computers, phones, and electronic equipment while passing on their old-but-still-usable devices to others who would benefit from them. Such networks would save money and reduce environmental waste. They would also extract more use out of the rare metals in electronics, which cause environmental degradation when they are mined and require large amounts of energy to recycle.

文獻引用 (REFERENCES)

「空缺鏈涉及資源獲取行為的獨特模式，決定了可重複使用的資源如何在動物族群中分配。目前，人們已經對幾種寄居蟹的殼空缺鏈進行了描述，並已證明一個單獨的空缺殼可以引發一系列空缺，從而有效地在許多個體之間分配資源利益。」(Randi Rotjans et al. 2010)

「我們比較了人類和寄居蟹族群中透過空缺鏈進行的資源分配，發現了一些意想不到的相似之處。...。我們認為，這種資源分配對於任何群體的社會組織都有特定而類似的影響——無論是動物還是人類。(Ivan Chase and Theodore DeWitt 1988)

“Vacancy chains involve unique patterns of resource acquisition behaviors that determine how reusable resources are distributed through animal populations. Shell vacancy chains have now been described for several hermit crab species, and it has been demonstrated that a single vacant shell can trigger a sequential chain of vacancies that effectively distributes resource benefits across many individuals.” (Randi Rotjans et al. 2010)

“[W]e compare the allocation of resources via vacancy chains in human and hermit crab populations and find some unexpected similarities. ... [W]e suggest that this kind of resource allocation has specific and analogous consequences for social organization in any population where it occurs —whether animal or human.” (Ivan Chase and Theodore DeWitt 1988)

參考文獻清單與連結 (REFERENCE LIST) Harvard 或 APA 格式

Randi Rotjan, Jeffrey Chabot, and Sara Lewis (April 1, 2010) Social context of shell acquisition in *Coenobita clypeatus* hermit crabs. *Behavioral Ecology* (<https://academic.oup.com/beheco/article-abstract/21/3/639/220022?redirectedFrom=fulltext&login=false>)

Ivan Chase and Theodore DeWitt (March 1, 1988) Vacancy chains: a process of mobility to new resources in humans and other animals. *Social Science Information* (<https://journals.sagepub.com/doi/10.1177/053901888027001003>)

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生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)

撰寫/翻譯/編修者與日期

劉宸燦翻譯 (2025/3/13); 許秋容編修 (2025/09/11)

AskNature 原文連結

<https://asknature.org/strategy/social-networking-aids-housing-search/>